New Claims to be entered

Claims 34 through 49 are cancelled.

Claim 50. (New) An automated system for tracking the movement of one or more objects within a predefined area based upon computer analysis of captured video images and not requiring user intervention, comprising:

a first set of stationary cameras for generating a first video stream of images that together form a contiguous and continuous view of the predefined area;

a first algorithm operated on a computer system responsive to the first stream of video images for analyzing those images to first determine the relative X, Y coordinates and the dimensional characteristics of at least the size of each object within the predefined area and for forming a tracking database representative of each object's coordinates, movements and dimensional characteristics;

a second set of movable cameras responsive to the tracking database, wherein each movable camera is automatically directed without user intervention to maintain an independent view of one or more objects within the predefined area and where the second set of movable cameras continuously outputs a second stream of video images, and

a second algorithm operated on a computer system responsive to the second stream of video images for determining additional relative X, Y and Z coordinates and the dimensional characteristics of at least the size of each object and for updating the tracking database.

Claim 51. (New) The system of claim 50 wherein the contiguous view formed by the first set of stationary cameras is substantially parallel to the ground surface within the predefined area.

Claim 52. (New) The system of claim 51 further comprising:

markers adhered onto one or more locations on each object to be tracked within the predefined area that reflect, retroreflect or fluoresce energy, and

a third algorithm operated on a computer system responsive to the energy reflecting, retroreflecting or fluorescing off the markers for updating the tracking database with related X, Y and Z coordinates of each marker matched to each marked object.

Claim 53. (New) The system of claim 52 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising:

one or more energy sources emitting non-visible energy that is reflected or retroreflected, or emitting energy that is fluoresced by the markers and is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 54. (New) The system of claim 53, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy, and

a forth algorithm operated on a computer system for locating and recognizing the encoded markers within either the first or second stream of video images and for updating the tracking database with each object's identity matched to its coordinates.

Claim 55. (New) The system of claim 54 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 56. (New) The system of claim 50 further comprising:

markers adhered onto one or more locations on each object to be tracked within the predefined area that reflect, retroreflect or fluoresce energy, and

a third algorithm operated on a computer system responsive to the energy reflecting, retroreflecting or fluorescing off the markers for updating the tracking database with related X, Y and Z coordinates of each marker matched to each marked object.

Claim 57. (New) The system of claim 56 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising:

one or more energy sources emitting non-visible energy that is reflected or retroreflected, or emitting energy that is fluoresced by the markers and is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 58. (New) The system of claim 57, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy, and

a forth algorithm operated on a computer system for locating and recognizing the encoded markers within either the first or second stream of video images and for updating the tracking database with each object's identity matched to its coordinates.

Claim 59. (New) The system of claim 58 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 60. (New) The system of claim 50 for tracking the movement of two or more objects, wherein the second set of moveable cameras comprises at least two cameras and wherein the second set is additionally directed to automatically reassign any one or more cameras following any one or more objects to follow a different one or more objects based upon which camera views may currently be blocked by one object in front of another with respect to any camera view.

Claim 61. (New) An automated system for controlling some combination of at least the pan, tilt and/or zoom controls of one or more second movable cameras as they video the activities of one or more objects in a predefined area, where the control signals directing the second movable cameras are automatically generated without user intervention and based upon computer analysis of video images captured by one or more first stationary cameras that together form a contiguous and continuous view of the same area, comprising:

a first set of stationary cameras for generating a first video stream of images that together form a contiguous and continuous view of the predefined area;

a first algorithm operated on a computer system responsive to the first stream of video images for analyzing those images to first determine the relative X, Y coordinates and the dimensional characteristics of at least the size of each object within the predefined area and for forming a tracking database representative of each object's coordinates, movements and dimensional characteristics, and

a second set of movable cameras responsive to the tracking database, wherein each movable camera is automatically directed without user intervention to maintain an independent view of one or more objects within the predefined area and where the second set of movable cameras continuously outputs a second stream of video images.

Claim 62. (New) The system of claim 61 wherein the second video stream is analyzed by a second algorithm operated on a computer system to determine additional relative X, Y and Z

coordinates and the dimensional characteristics of at least the size of each object and for updating the tracking database.

Claim 63. (New) The system of claim 62 wherein the contiguous view formed by the first set of stationary cameras is substantially parallel to the ground surface within the predefined area.

Claim 64. (New) The system of claim 63 further comprising:

markers adhered onto one or more locations on each object to be tracked within the predefined area that reflect, retroreflect or fluoresce energy, and

a third algorithm operated on a computer system responsive to the energy reflecting, retroreflecting or fluorescing off the markers for updating the tracking database with related X, Y and Z coordinates of each marker matched to each marked object.

Claim 65. (New) The system of claim 64 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising:

one or more energy sources emitting non-visible energy that is reflected or retroreflected, or emitting energy that is fluoresced by the markers and is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 66. (New) The system of claim 65, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy, and

a forth algorithm operated on a computer system for locating and recognizing the encoded markers within either the first or second stream of video images and for updating the tracking database with each object's identity matched to its coordinates.

Claim 67. (New) The system of claim 66 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 68. (New) The system of claim 61 further comprising:

markers adhered onto one or more locations on each object to be tracked within the predefined area that reflect, retroreflect or fluoresce energy, and

a third algorithm operated on a computer system responsive to the energy reflecting, retroreflecting or fluorescing off the markers for updating the tracking database with related X, Y and Z coordinates of each marker matched to each marked object.

Claim 69. (New) The system of claim 68 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising:

one or more energy sources emitting non-visible energy that is reflected or retroreflected, or emitting energy that is fluoresced by the markers and is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 70. (New) The system of claim 69, wherein the objects are additionally identified, further comprising:

at least one uniquely encoded marker adhered onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy, and

a forth algorithm operated on a computer system for locating and recognizing the encoded markers within either the first or second stream of video images and for updating the tracking database with each object's identity matched to its coordinates.

Claim 71. (New) The system of claim 70 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 72. (New) The system of claim 61 for tracking the movement of two or more objects, wherein the second set of moveable cameras comprises at least two cameras and wherein the second set is additionally directed to automatically reassign any one or more cameras following any one or more objects to follow a different one or more objects based upon which camera views may currently be blocked by one object in front of another with respect to any camera view.

Claim 73. (New) A method for tracking the movement of one or more objects within a predefined area based upon computer analysis of captured video images and not requiring user intervention, comprising the steps of:

capturing a continuous first stream of video images using a first set of stationary cameras, wherein the images together form a contiguous and continuous view of the predefined area;

detecting the X, Y coordinates and the dimensional characteristics of at least the size of each object relative to the predefined area using computer based image analysis of the first stream of video images;

using the detected X, Y coordinates and dimensional characteristics regarding each object to automatically and individually direct some combination of at least the pan, tilt and/or zoom movements of a each camera in a second set of one or more movable cameras without the aid of an user;

capturing a continuous second stream of video images using the second set of automatically movable cameras, wherein the images create independent views of one or more of the objects within the predefined area;

detecting additional X, Y and Z coordinates and the dimensional characteristics of at least the size of each object viewed using computer based image analysis of the second stream of video images, and

combining the information detected by image analysis of both the first and second video streams into a continuously updated tracking database indicating the relative X, Y and Z coordinates and dimensional characteristics of the objects relative to the predefined area.

Claim 74. (New) The method of claim 73 wherein the contiguous view formed by the first set of stationary cameras is substantially parallel to the ground surface within the predefined area.

Claim 75. (New) The method of claim 74 further comprising the steps of:

placing markers onto one or more locations on each object to be tracked that reflect, retroreflect or fluoresce energy;

detecting the reflected, retroreflected or fluroesced energy in order to determine the X, Y and Z coordinates of each marker using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the relative X, Y and Z coordinates of the detected markers matched with the respective objects.

Claim 76. (New) The method of claim 75 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising the step of:

using one or more energy sources to emit non-visible energy that is reflected or retroreflected, or energy that is fluoresced, throughout the predefined area that is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 77. (New) The method of claim 76, further comprising the steps of:

placing at least one uniquely encoded marker onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy;

detecting each unique identifier using computer based image analysis of the first and second streams of video without the aid of an user, and

updating the tracking database to indicate the identity of each object for which sufficient encoded markers were detected and decoded.

Claim 78. (New) The method of claim 77 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 79. (New) The method of claim 73 further comprising the steps of:

placing markers onto one or more locations on each object to be tracked that reflect, retroreflect or fluoresce energy;

detecting the reflected, retroreflected or fluoresced energy in order to determine the X, Y and Z coordinates of each marker using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the relative X, Y and Z coordinates of the detected markers matched with the respective objects.

Claim 80. (New) The method of claim 79 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising the step of:

using one or more energy sources to emit non-visible energy that is reflected or retroreflected, or energy that is fluoresced, throughout the predefined area that is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 81. (New) The method of claim 80, further comprising the steps of:

placing at least one uniquely encoded marker onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy;

detecting each unique identifier using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the identity of each object for which sufficient encoded markers were detected and decoded.

Claim 82. (New) The method of claim 81 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 83. (New) The method of claim 73 for tracking the movement of two or more objects, wherein the step for using the detected X, Y coordinates and dimensional characteristics regarding each object to automatically and individually direct some combination of at least the pan, tilt and/or zoom movements of a each camera in a second set of one or more movable cameras further comprises the step of dynamically considering the location of each object with respect to the view of each camera and automatically reassigning any one or more cameras following any one or more objects to follow a different one or more objects based upon which camera views may currently be blocked by one object in front of another with respect to any camera view.

Claim 84. (New) A method for controlling some combination of at least the pan, tilt and/or zoom controls of one or more second movable cameras as they video the activities of one or more objects in a predefined area, where the control signals directing the second movable cameras are automatically generated without user intervention and based upon computer analysis of video images captured by one or more first stationary cameras that together form a contiguous and continuous view of the same area, comprising the steps of:

capturing a continuous first stream of video images using a first set of stationary cameras, wherein the images together form a contiguous and continuous view of the predefined area;

detecting the X, Y coordinates and dimensional characteristics of at least the size of each object relative to the predefined area using computer based image analysis of the first stream of video images;

using the detected X, Y coordinates and dimensional characteristics regarding each object to automatically and individually direct some combination of at least the pan, tilt and/or zoom movements of a each camera in a second set of one or more movable cameras without the aid of an user, and

capturing a continuous second stream of video images using the second set of automatically movable cameras, wherein the images create independent views of one or more of the objects within the predefined area.

Claim 85. (New) The method of claim 84 further comprising the step of storing the detected X, Y coordinates and dimensional characteristics regarding each object in a tracking database.

Claim 86. (New) The method of claim 85 wherein the contiguous view formed by the first set of stationary cameras is substantially parallel to the ground surface within the predefined area.

Claim 87. (New) The method of claim 86 further comprising the steps of:

detecting additional X, Y and Z coordinates and dimensional characteristics of at least the size of each object viewed by using computer based image analysis on the second stream of video images, and

updating the tracking database with the additional X, Y and Z coordinates and dimensional characteristics from the analysis of the second video streams.

Claim 88. (New) The method of claim 87 further comprising the steps of:

placing markers onto one or more locations on each object to be tracked that reflect, retroreflect or fluoresce energy;

detecting the reflected, retroreflected or fluoresced energy in order to determine the X, Y and Z coordinates of each marker using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the relative X, Y and Z coordinates of the detected markers matched with the respective objects.

Claim 89. (New) The method of claim 88 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising the step of:

using one or more energy sources to emit non-visible energy to be reflected or retroreflected, or energy to be fluoresced, throughout the predefined area that is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 90. (New) The method of claim 89, further comprising the steps of:

placing at least one uniquely encoded marker onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy;

detecting each unique identifier using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the identity of each object for which sufficient encoded markers were detected and decoded.

Claim 91. (New) The method of claim 90 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 92. (New) The method of claim 84 further comprising the steps of:

placing markers onto one or more locations on one or more objects to be tracked that reflect energy;

detecting the reflected energy in order to determine the X, Y and Z coordinates of each marker using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the relative X, Y and Z coordinates of the detected markers matched with the respective objects.

Claim 93. (New) The method of claim 92 wherein the markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent, further comprising the step of:

using one or more energy sources to emit non-visible energy throughout the predefined area that is detectable by both the first set of stationary cameras and the second set of movable cameras.

Claim 94. (New) The method of claim 93, further comprising the steps of:

placing at least one uniquely encoded marker onto a top surface of each object to be identified that reflects, retroreflects or fluoresces energy;

detecting each unique identifier using computer based image analysis of the first and second streams of video, and

updating the tracking database to indicate the identity of each object for which sufficient encoded markers were detected and decoded.

Claim 95. (New) The method of claim 94 wherein the uniquely encoded markers reflect, retroreflect or fluoresce primarily non-visible energy and are therefore substantially visibly transparent.

Claim 96. (New) The method of claim 84 for tracking the movement of two or more objects, wherein the step for using the detected X, Y coordinates and dimensional characteristics regarding each object to automatically and individually direct some combination of at least the pan, tilt and/or zoom movements of a each camera in a second set of one or more movable cameras further comprises the step of dynamically considering the location of each object with respect to the view of each camera and automatically reassigning any one or more cameras following any one or more objects to follow a different one or more objects based upon which camera views may currently be blocked by one object in front of another with respect to any camera view.